

ABSTRACT OF THE DISCLOSURE

A Combinatorial Optical Processor and method for the architecture of optical systems utilizes one or more optical modules, each module including a number of individually addressable optical elements. The optical elements are arranged and addressed in a combinatorial-arithmetic fashion such that a set of optical filter functions are defined, and can be performed, by the optical modules. The number of optical filter functions may be an exponential function of the number of addressable optical elements. Additionally, each of the optical filter functions may be addressed at random and a plurality of such functions may be addressed simultaneously. Apparatus, such as imaging systems, may employ the Combinatorial Optical Processor in order to include without limitation the features of being solid-state, projection of images into free space and random addressability of the filter functions of the system. Combinatorial optical processing principles may be implemented as a method of optical digital to analog conversion. A free-space randomly-addressable interactive three-dimensional display system based on the Combinatorial Optical Processor is also described.